Riding the Stormwater Wave!

Grade Levels: 3rd, 6th, 8th, 9th, 10th, 11th, 12th

Ocean Literacy Standards:

Focus Question:
- What are the sources of pollution in stormwater systems?
- What are the impacts of pollution in stormwater systems?

Objectives: The students will
- Discuss pollution types: point source and non point source.
- Discuss stormwater and stormwater conveyance systems: combined and separate.
- Understand stewardship's impact on waterways and watersheds.
- Understand connectedness of inland to marsh to ocean.

Materials:
- Clean non glass trash (1 per students)
- OPTIONAL: Agility tube to serve as stormwater pipe

Key Words:
- Combined Sewer System (CSS)
- Municipal Separate Storm Sewer System (MS4)
- Nonpoint Source Pollution
- Point Source Pollution
- Stewardship
- Stormwater
- Water Basin
- Watershed

Procedure:
1. Have students line up in a straight line, shoulder to shoulder holding 1 piece of clean trash.
2. IF *NO* AGILITY TUBE AVAILABLE:
    a. Designate the student at the far left as "DOWNTOWN" or developed area.
    b. Designate student at the far right as "OUTFALL" or ocean.
    c. All students in between DOWNTOWN and OUTFALL represent what the stormwater flows over or through on its journey out the outfall and into the ocean. So, these students represent roadways, sidewalks, ditches, pipes, swales, and all properties connecting the developed downtown area to the outfall that empties into the ocean.
    d. Read the following story. As you read the story, the left most student will pass their piece of trash to student on their left. Second student now has 2 pieces of trash. Cue this student to pass the trash as you continue reading. Third student now has 3 pieces of trash. Continue reading and having the trash accumulate down the line until all trash is passed to the student at the far right. Time it so that this happens when you end the story. This last student, designated as the

OUTFALL, will be standing while trying to hold onto a large pile of trash that most likely has fallen around their feet. This is a perfect visual on how trash accumulates at the end of pipes.

3. IF AGILITY TUBE AVAILABLE:
   a. Set up the agility tube that will serve as the "stormwater pipe." Label one end of the tube as DOWNTOWN or developed area and the other end as OUTFALL or ocean. The tube represents the pipes and conveyance systems of a municipal separate storm sewer system (MS4) that connects Chatham County municipalities to the oceans and marshes.
   b. Read the story and as you read the story, cue the students when it is their turn to crawl through the "stormwater pipe." Once through the pipe, the students leave their trash at the outfall/ ocean and can return to their seats.
   c. Trash left at the outfall provides a great visual of what happens to trash after a heavy rain. The trash was left on the ground and has now washed into the ocean.

STORY FOR RIDING THE STORMWATER WAVE!

I was visiting Savannah one day last summer. What a beautiful city! As I walked around town, I noticed a discarded used paper mask on the ground **(Pass Trash),** but I didn't have any gloves and didn't feel safe picking it up. **(Pass Trash)** So, I walked on and as I walked around the squares, I noticed the beautiful scenery, but I also noticed visitors tossing gum wrappers on the ground. **(Pass Trash)** The wind was blowing and I noticed a family having a picnic was letting their paper plates and napkins blow away. **(Pass Trash)** It was blowing into the roadways and now their trash lay against the edge of a huge opening in the curb. **(Pass Trash)** No one picked up the windblown trash. **(Pass Trash)** And, there was more trash blowing about from the truck that zoomed past. Soda bottles blew out of his truck bed and he did nothing to stop it **(Pass Trash).** I tried to catch some of the items and throw them away, but a gentleman walking his dog just hollered at me that it was "OK as the street sweeper picks up all that trash. **(Pass Trash)** They assured me that it would be filtered out and properly thrown away **(Pass Trash).**

I continued with my visit and went to check out Lake Mayer. What a wonderful park with a lake! How peaceful and fun to have a nice park to walk and take your dogs for a walk!! Or so I thought- there were so many people letting their dogs use the bathroom and not pick up the poop! **(Pass Trash**) THAT IS SO GROSS! I don't want to step in poop, so I didn't stay to walk. So, I hopped back in my car and as I was leaving Lake Mayer, I noticed a wide grassy ditch littered with fast food wrappers **(Pass Trash).** There were plenty of trash cans near the area, but each can was full and overflowing onto the ground and making a mess! **(Pass Trash).** Why hadn't these trash cans been emptied? **(Pass Trash)** And, why did people keep dumping trash into them when it obviously was falling on the ground? **(Pass Trash)**

Just as I was leaving Lake Mayer, the summer rains began to fall. I'm glad I had packed my raincoat as I had more time to explore! I thought I'd hop on Truman and hit the beach – maybe

the rains would pass while I drove out to Tybee Island. As I drove along Truman Expressway, there was furniture and random shoes discarded alongside the lanes. **(Pass Trash)** The rain had picked up and I slowed down. The heavy rainfall was carrying all sorts of trash alongside the cement center barrier. **(Pass Trash)** Where was the trash going? As I drove out to Tybee Island, the rains got heavier and as I parked, the rains ended. I walked out to the beach and what a beautiful sight! The ocean, crashing waves, blue skies. I walked out to put my toes in the water and realized there were other items in the water. The tide was bringing discarded masks, candy and gum wrappers, soggy paper plates and dirty napkins, plastic soda bottles, and fast food wrappers up on shore. Litter was coming onto the beach. OH NO! BUT WAIT! These items were the various pieces of trash that I had seen on the roads and in the ditches from my visit to town. How did it get here? And, what about the pet waste that no one picked up?!?!?

Well, I had experienced a STORMWATER WAVE. When rains fall on Chatham County, the rains wash across the land and clean off roads, yards, and sidewalks as the rainfall flows into ditches and curb inlets (the openings in the curb). This rainfall, now known as stormwater, is rushing through the conveyance systems that are designed to get the rainwater off of land and out to sea as quickly as possible to prevent flooding of roads and properties. In Chatham County, there is NO FILTRATION of stormwater once it enters the conveyance system. So, everything that flows into the curb inlets, ditches, pipes, etc will eventually end up in the nearest waterway, marsh or ocean.

Observations:
- Ask the student representing the ocean, how it felt to be left balancing everyone's trash. Or how the students felt leaving the trash in the ocean.
- Could any of the trash items used in the scenario been recycled or reused? If so, which items and how?
- Ask student to think and identify a way in which they can prevent trash from entering the ocean through storm drains or during rain fall events.
- How can your watershed be affected by pollution?

Conclusion:
- Have students research their watershed using the following web page: http://cfpub.epa.gov/surf/state.cfm?statepostal=GA
- Have students research the impacts of certain types of pollution on recreation uses of waterways such as fishing or swimming.
- Draw your watershed including: cities, agriculture, factories, water treatment plants, wastewater treatment plants, landfills, and any other infrastructure that could potential pollute the watershed.
- Have students research recycling codes and what can be recycled in your area.

Adapted by Dr. Angela Bliss, Chatham County Department of Engineering, based on *Downstream from Here* in the Adopt-A-Wetland (AAW) Curriculum Guide.